AMENDMENTS TO THE SPECIFICATION:

Please add the following paragraph on page 1, after the title:

This application is a division of Application No. 09/635,138, filed August 9, 2000, which was a division of Application No. 09/023,613, filed February 13, 1998, the entire content of each of which is hereby incorporated by reference in this application.

Please replace the paragraphs appearing at page 1, line 20 – page 2, line 17 with the following amended paragraphs.

As an ignition coil, a stick-type ignition coil is known. It has a rod-shaped central core disposed in a housing, and a primary coil and a secondary coil wound respectively on a primary spool and a secondary spool made of resin. Resin is filled in the housing of the ignition coil as an electric insulator. The insulator not only provides electric insulation among individual members in the housing but also fills clearances between wires of the coils thereby to restrict ~~movements~~ movement or breakage of the coils which may arise from engine vibrations. As the insulator, a thermosetting resin such as epoxy is used in consideration of the heat resistance. The ignition coil further has a permanent magnet attached to at least one of the two longitudinal ends of the central core to raise a voltage to be supplied to a spark ignition plug.

In this type of ignition coil, the central core contacts with not only the resin insulator but also a case member such as a spool enclosing the outer circumference of the central core. The central core and the resin insulator or the case member, as having different thermal expansion coefficients, may ~~repeat expansions and contractions~~ repeatedly expand and contract as the surrounding temperature rises and falls. Then, the resin insulator or the case member, as contacting with the central core, especially the resin insulator or the case member contacting the longitudinal end corners of the central core, may crack, which results in defective electric insulation.

Please replace the paragraph appearing at page 2, line 27 – page 3, line 9 with the following amended paragraph:

If the central core and the resin insulator or the case member ~~are caused to repeat the expansions~~ repeatedly expand and ~~the contractions by the change~~ contract due to changes in the temperature, the central core is caused to receive a load in the radial direction and in the longitudinal direction from the resin insulator and the case member ~~by~~ due to the difference in the thermal expansion coefficient. Especially when the central core receives the load in the longitudinal direction, the magnetic permeability of the core may drop causing ~~the~~ magneto-striction which disables generation of a required high voltage.

Please replace the paragraph appearing at page 3, line 20 – page 4, line 2 with the following amended paragraph.

In another ignition coil disclosed in Japanese Utility Model Publication No. 59-30501, although not a stick-type, the corners of the core are covered by over—coating the surface of the core with an elastomer. This prevents the corners of the core and the insulator made of epoxy resin from coming into direct contact with each other and suppresses ~~the~~ cracks in the epoxy resin in the vicinity of the corners of the core. This over coating is not applicable to the stick-type ignition coil, however, because the stick-type is so regulated in its external diameter as to match the internal diameter of the plug hole.

Please replace the paragraphs appearing at page 4, line 8 – page 6, line 23 with the following amended paragraphs:

It is an object of the present invention to provide an ignition coil capable of suppressing drawbacks caused by ~~a change~~ changes in surrounding temperature.

It is another object of the invention to provide an ignition coil capable of suppressing cracks from occurring in the vicinity of the longitudinal end corners of the a central core and/or outer core.

It is a further object of the invention to provide an ignition coil capable of suppressing dielectric breakdown caused by ~~a change~~ changes in surrounding temperature.

According to the first aspect of the invention, an ignition coil has an elastic buffer member at at least one of longitudinal end corners of a central core to absorb a difference in thermal expansion coefficients between ~~the~~ a central core and a resin insulator or a case member such as a spool. As a result, even if the resin insulator or the case member having the thermal expansion coefficient different from that of the central core ~~repeats the expansions and contractions~~ repeatedly expands and contracts together with the central core as the temperature changes, the resin insulator and the case member in the vicinity of the longitudinal end corners of the central core can be prevented from cracking. Alternatively, at least one of the two end corners of the central core may be surrounded by a space, so that a case member such as a spool or a resin insulator enclosing the outer circumference of the central core is not in contact with the longitudinal end corners of the central core.

According to the second aspect of the invention, an 5 ignition coil has an angled member to cover the inner circumference corner of the longitudinal end of an outer core which is arranged around the outer circumferences of a primary coil and a secondary coil, so that a resin insulator is restricted from coming into direct contact with the inner circumference corner of the outer core. As a result, even if the outer core and the resin insulator, having ~~the~~ different expansion coefficients, ~~repeat the expansions and contractions~~ repeatedly expands and contracts as the temperature changes, cracks can be suppressed in the resin insulator in the vicinity of the inner circumference corner of the outer core. As a result, the electric discharge can be suppressed so that the drop in the voltage to be applied to an ignition plug can be restricted. Alternatively, the spool may have a flange to be arranged to cover the longitudinal end corner of the outer core, so that the cracks, if caused in the resin insulator in the vicinity of the inner circumference corner of the outer core, will hardly extend to the inner circumference because of being shielded by the outer spool. As a

result, the cracks are less likely to reach electric wires connecting the coils and terminals in the ignition coil electrically.

According to the third aspect of the invention, an ignition coil has a separating member to separate a spool and a resin insulator from each other so that the spool and the resin insulator disposed inside and outside of the separating member can expand/contract separately from each other with a change in ~~temperatures~~ temperature. Thus, the spool and the resin insulator are prevented from cracking in a peripheral part on which a large force is liable to act.

According to the fourth aspect of the invention, a resin material used for at least an inner one of a primary spool and a secondary spool contains more than 5 weight % of rubber component. Accordingly, even if the inner spool is hindered from contracting toward the inside more than a coil wound thereon in low temperature by adhesion, it can reduce the distortion and can extend while maintaining the adhesion with the coil, thereby restricting the inner spool from cracking.

According to the fifth aspect of the invention, an ±5 ignition coil has an insulator made of a flexible material to hold individual members adhered to one another even if the members having different thermal expansion coefficients expand and contract as the temperature changes. Preferably, an average of the thermal expansion coefficient at -40 0C to 130 0C is set within a range of 10 to 30 ppm in a test method corresponding to ASTMD790, so that a thermal expansion coefficient of the insulator becomes close to that of iron or copper used for a core or coils, thus restricting distortion of spools and the insulator.

Please replace the paragraphs appearing at page 12, line 1 – page 13, line 6 with the following amended paragraphs:

The cylindrical member 17 is integrally formed into a cylindrical tube shape, as shown in Fig. 2. The cylindrical member 17 is comprised of a cylindrical part 17a, annular or ring parts 17b and 17c formed at the two longitudinal ends (top and bottom) of the cylindrical part 17a and having through holes 18 formed at their centers, and

angled parts 17d formed at corners between the cylindrical part 17a and the annular parts 17b and 17c. As shown in Figs. 3 and 4, the cylindrical part 17a.covers the outer circumference of the central core assembly 13, the annular parts 17b and 17c cover the portions of the two longitudinal end faces of the central core assembly 13, and the angled parts 17d cover the end corners of the permanent magnets 14 and 15 or the two end corners (end edges) of the central core assembly 13. The annular parts 17b and 17c are made thicker than the cylindrical part 17a to function as a second buffer member. The through holes 18 are made diametrically smaller than the permanent magnets 14 and 15 so that the core 12 and the permanent magnets 14 and 15 are fitted into the cylindrical member 17 by expanding diametrically the through holes 18.

As shown in Figs. 1 ~~and 3~~, 3 and 4, the secondary spool 20 is arranged on the outer circumference of the cylindrical member 17 and is molded of a resin material into such a bottomed cylinder as is closed at the longitudinal end side of the permanent magnet 15. The secondary coil 21 is wound on the outer circumference of the secondary spool 20, and a dummy coil 22 is further wound by one turn on the higher voltage side of the secondary coil 21. The dummy coil 22 connects the secondary coil 21 and a terminal plate 40 electrically. Since the secondary coil 21 and the terminal plate 40 are electrically connected through not a single but the dummy coil 22, the surface area of the electrically connected portion between the secondary coil 21 and the terminal plate 40 is enlarged to avoid the concentration of electric field at the electrically connected portion.

Please replace the paragraph beginning at page 23, line 9, with the following amended paragraph:

Although the cylindrical member 17 and the plate members 17e, 17f, 17g are molded of rubber, the cylindrical member 17 and the plate members 17e, 17f, 17g can be molded of an elastomer resin, and the cylindrical member 17 can be insert—molded to have the central core assembly 13 integrally therein. Alternatively, the central core

assembly 13 may be inserted into the cylindrical member ~~12~~ 17 which is molded of the elastomer resin.